Claims

1. A r active microreactor wherein a group of the following formula (1) which can bind to a member of specifically binding partner, is bound to a part or entirety of a wall surface of a channel:

$-L-SO_2-X^1$ (1)

wherein X^1 represents $-CR^1=CR^2R^3$ or $-CHR^1-CR^2R^3Y$; R^1, R^2 and R^3 independently represent an atom or a group selected from the group consisting of a hydrogen atom, a C1-6 alkyl group, a C6-20 aryl group, and a C7-20 aralkyl group having a C1-6 alkyl chain; Y represents a group which can be substitutable by a nucleophilic reagent or a group which is released as "HY" by a base; and L represents a linking group.

2. A method for producing a reactive microreactor of claim 1, which comprises contacting a microreactor where a reactive group is introduced on the surface with a disulfon compound of the following formula (2):

$X^1-SO_2-L^2-SO_2-X^2$ (2)

wherein X^1 and X^2 independently represent $-CR^1=CR^2R^3$ or $-CHR^1-CR^2R^3Y$; R^1, R^2 and R^3 independently represent an atom or a group selected from the group consisting of a hydrogen atom, a C1-6 alkyl group, a C6-20 aryl group and a C7-26 aralkyl group having a C1-6 alkyl chain; Y represents a group which can be substituted by a nucleophilic reagent or a group which is released as "HY" by a base; and L^2 represents a linking group.

3. A biological material-bound microreactor, wherein a group of the following formula (3) having a residual group of a member of specifically binding partner is bound to a part or entirety of a wall surface of a channel:

$-L-SO_2-X-A$ (3)

wherein L represents a linking group which bind $-SO_2-X-A$ to the wall surface of the channel inside the microreactor; X represents $-CR^{11}(R^{12})-CR^{13}(R^{14})-$; R^{11}, R^{12}, R^{13} and R^{14} independently represent a hydrogen atom, a C1-6 alkyl group, a C6-20 aryl group or a C7-26 aralkyl group having a C1-6 alkyl chain; A represents a

residual group of the member of the specifically binding partner.

4. The biological material-bound microreactor according to claim 3 wherein a plurality of the specifically binding partner are bound to different positions of the wall surface of the chann l of the microreactor.

5. The biological material-bound microreactor according to claim 3 wherein the specifically binding partner comprises a member which forms a biological specific bond.

6. The biological material-bound microreactor according to claim 3 wherein the specifically binding partner is a combination of an antibody or antibody fragment and a ligand, a combination of an antibody or antibody fragment and an antigen, a combination of an antibody or antibody fragment and a hapten, or a combination of a receptor and a ligand.

7. The biological material-bound microreactor according to claim 3 wherein the specifically binding partner is a combination of avidins and biotins.

8. The biological material-bound microreactor according to claim 3 wherein the avidins are avidin, streptoavidin, or a modified compound thereof capable of forming a stable complex with biotin.

9. The biological material-bound microreactor according to claim 3 wherein the biotins are biotin, biocytin, desthiobiotin, oxybiotin, or a derivative thereof capable of forming a stable complex with avidin.

10. The biological material-bound microreactor according to claim 3 wherein the specifically binding partner is a combination of a nucleic acid and a nucleic acid, or a combination of a nucleic acid and a nucleic acid-binding substance.

11. The biological material-bound microreactor according to claim 3 wherein the nucleic acid is a nucleotide derivative, a peptide nucleic acid, or LNA;

12. The biological material-bound microreactor according to claim 3 wherein the nucleic acid-binding substance is a double-stranded DNA recognizing material.

13. The biological material-bound microreactor according

to claim 3 wherein the doubl -stranded DNA recognizing substance is a double-stranded DNA recognizing antibody, a DNA transcription factor, a protein having a Zn finger motif or a ring finger motif, or a peptide nucleic acid.

14. The biological material-bound microreactor according to claim 3 wherein A represents a residual group of a protein in the formula (3).

15. The biological material-bound microreactor according to claim 3 wherein the wall surface of the channel inside the microreactor is glass, quartz, plastic, silicon resin, electrode surface, or sensor chip surface.

16. A method for producing the biological material-bound microreactor of claim 3, which comprises a step of contacting the reactive microreactor of claim 1 with at least one of a member of specifically binding partner having a reactive group which reacts with a group of the aforementioned formula (1) and forms a covalent bond.

17. The method according to claim 16, wherein the wall surface of the channel inside the microreactor is contacted with at least one of a member of specifically binding partner, and then a free reactive group present on the surface is subjected to blocking treatment with an aqueous solution of an amino acid, a peptide or a protein.

18. A method for detecting a target substance, which comprises steps of: contacting the biological material-bound microreactor of claim 3 with a sample containing a target substance which specifically binds to a member of specifically binding partner which was immobilized on the surface of the microreactor; and detecting formation of a bond between the member of specifically binding partner and the target substance.